to the rainfall in that country but depend entirely upon the proper utilization of the annual overflow of the Nile, whose waters come from two sources, Abyssinia and Central Africa. This water supply for the Nile depends, like that of the Mississippi, upon two or three rainy regions, each of which is governed by its own laws. We should fall into hopeless confusion if we should indiscriminately combine together the records of droughts in such various climatic regions in hopes of deducing natural periodicities or other meteorological laws.

ON HIGHS AND LOWS.

A correspondent in Dublin, Ind., requests the Editor of the REVIEW to give its readers "some information on high and low in regard to the barometer; it is not clear to some whether high refers to the long or short arm of the mercury and low *vice versa*."

The words "high" and "low" are used as contractions for "high pressure" and "low pressure." Inasmuch as atmospheric pressure is measured by the barometer, these expressions are also equivalent to saying that the column of mercury in the barometer is a tall or a short one. If a syphon barometer is used, the top of the long column is above the top of the short column by a larger or smaller amount; the difference in height between the tops of the long and short column is usually more than 30 inches when the pressure is high and less than 30 inches when the pressure is low and when the station is near sea level. If an aneroid barometer is used, the index or pointer usually turns toward the right hand for higher pressures and toward the left hand for lower pressures.

If the reader has access to a map showing the condition of the atmosphere at any time, and such weather maps are distributed by thousands every day, he will perceive that the published barometric pressure is expressed in inches and hundredths and that the height of the barometric column ranges between 28 and 31 inches. The map shows, by means of isobaric lines, the regions where the pressure is the same. Some of these isobars inclose a region of high pressure and others a region of low pressure. These regions move along day by day, as shown by successive maps, and the tracks pursued by their centers are published regularly on Charts I and II of the MONTHLY WEATHER REVIEW. High areas are the regions of high barometric pressure and low areas are the regions of relatively low barometric pressure. With the high areas we usually associate cool or cold, dry, clear weather and gentle winds. With the low areas we usually expect warmer, moist, cloudy, and rainy weather and strong winds, and sometimes also thunderstorms, tornadoes, and hailstorms. Therefore, the low areas are sometimes spoken of as storm centers.

The term barometric pressure or simply barometric reading is often used without realizing its meaning in meteorology. Ordinarily we appreciate the temperature of the air by our personal sensations so clearly that when we see a record of 100° F., we instinctively think of the heat and the temperature, and the most ordinary meteorological observer doubtless sees in his mind's eye the relative levity or buoyancy of the air, due to the fact that it is expanded by high temperature. But our nervous organization is not generally sensitive to the ordinary changes of atmospheric pressure; we have not a mechanical sense to tell us of the pressure or push of the ordinary air. Occasionally one will be found whose ears ring when the atmospheric pressure is high or whose nerves pain him when the pressure is low. To the meteorologist, however, the expression high or low pressure conveys an idea of force exerted in compressing the atmosphere and of expansive force within every cubic inch by which it tries to enlarge its boundary. To him a high barometer means that the air is being condensed by pressure, and *vice versa* a low barometer that the air is expanding by reason of the relief of pressure. The pressure ordinarily exerted by the atmosphere is about 15 pounds to the square inch. This pressure would balance the weight of a column of mercury 1 inch square and 30 inches high. This is the pressure that is holding every cubic inch of our lower atmosphere within its bounds; if the pressure relaxes the cubic inch of air expands. If, for instance, the weather map shows that a region of low pressure is advancing upon any station, the observer may expect to find the air within any confined space push outward through every possible aperture; the air in the soil comes up; that within a cavern pushes out through the entrance; bubbles of air in liquids expand in size; hermetically sealed cans bulge outward. These and similar phenomena show the observer that the pressure of the atmosphere upon all bodies at the surface of the earth has diminished and that internal pressures that before were counterbalanced by the atmospheric pressure now have the preponderance. The force that pushes the air forward when the wind blows is this atmospheric pressure of about 15 pounds to the square inch, or rather it is the difference in atmospheric pressure, since the full pressure of 15 pounds to the square inch could only come into play when the air or wind is blowing into an absolute vacuum.

The motion of the wind is the result of pressure from behind just as truly as is the motion of the piston rod of a locomotive engine. The piston usually has the atmospheric pressure of 15 pounds to the square inch on one side of it and the steam pressure of 100 or 200 pounds to the square inch on the other side, and this great difference of pressure is necessary in order that so small a piston may do so much work. The pressure and the action of the steam engine piston are intense. On the other hand, in the atmosphere a small portion of air moving along as a rapid wind has a very little excess of pressure in the rear over that in front. A vertical sheet of air 1 foot thick moving forward as the front of a violent gust may, for instance, have a pressure of 29.50 inches in front and 29.51 inches in the rear; this difference of .01 of an inch is about $\frac{1}{2950}$ of the whole pressure, or about 0.005 pounds per square inch, or 0.72 pounds per square foot. Now, a cubic foot of air weighs about $\frac{7}{100}$ of a pound, and as the above force is continuously pushing this mass, it soon gives it a great velocity, and maintains it at that velocity by continuously overcoming friction and other resistances. The atmospheric pressure pushing from all sides toward a region of low pressure soon sets the air into a whirling motion; it may be on a very small scale, forming a waterspout or a tornado that would scarcely make any show on our daily weather map, or it may be in great whirls, such as constitute hurricanes or other cyclonic storms, and which are those treated of in the chapter on areas of low pressure.

METEOROLOGICAL TABLES.

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Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.